<u>Amendments to the Claims/Listing of Claims</u>:

This listing of claims will replace all prior versions and listings of claims in the application:

1-11. (Cancelled)

12. (Currently amended) A device for identifying a first analyte of a group of analytes in a biological sample, including:

a substrate including a first plurality of ~~spaced-apart~~ regions <u>having a binding receptor thereon, the binding receptor being </u>configured to bind the first analyte<u>, and a second region without the binding receptor thereon, the second region separating individual regions of the first plurality of regions</u>;

an optical source configured to generate a probe beam<u>, the probe beam illuminating a beam spot on the substrate</u>~~ which illuminates the first plurality of spaced-apart regions in a sequential manner and interacts with the substrate to form a signal beam~~;

<u>a scanner configured to generate relative motion between the probe beam and the substrate such that the beam spot illuminates portions of the first plurality of regions and the second region in a sequential manner and interacts with the substrate to form a return beam, the return beam including a signal beam generated by the interaction of the probe beam with a portion of the first plurality of regions and a reference beam generated by the interaction of the probe beam with a portion of the second region;</u>

an interferometer ~~configured to combine with~~ <u>including </u>an adaptive optical element, <u>the adaptive optical element positioned and configured to combine </u>~~a reference beam and the signal beam, the combination of~~ the reference beam and the signal beam <u>to form </u>~~generating~~ an output beam; and

a detector configured to detect the presence or absence of the first analyte based upon the output beam.

13. (Currently amended) The device of claim 12, wherein the probe beam is reflected by the substrate to form the signal beam<u>, the substrate having an upper side and a lower side, the lower side being opposite the upper side, the optical source and the adaptive optical element being on the same side of the substrate</u>.

14. (Currently amended) The device of claim 12, wherein the probe beam is transmitted through the substrate to form the signal beam, the substrate having an upper side and a lower side, the lower side being opposite the upper side, the optical source and the adaptive optical element being on opposite sides of the substrate.

15. (Cancelled)

16. (Previously presented) The device of claim 12, wherein the substrate includes a plurality of concentric tracks spaced such that the probe beam illuminates a single track, the first plurality of spaced-apart regions being disposed on the plurality of concentric tracks.

17. (Currently amended) The device of claim 16, ~~further comprising~~ wherein the scanner comprises a motor configured to spin the substrate such that the probe beam is sequentially incident on the first plurality of spaced-apart regions of a first track, and a controller ~~configured to control on which track of the plurality of tracks the probe beam is incident~~, including a tracking device and a radial control, the tracking device causing the probe beam to follow a single track of the plurality of concentric tracks and the radial control causing the probe beam to move from one track of the plurality of concentric tracks to another track of the plurality of concentric tracks.

18. (Original) The device of claim 12, wherein the interferometer operates in a quadrature condition.

19-44. (Cancelled)

45. (Currently amended) The device of claim ~~15~~ 12, further comprising:

a motor configured to spin the substrate;

wherein the probe beam generated by the optical source illuminates the first plurality of ~~spaced-apart~~ regions and the second region ~~plurality of regions~~ in a sequential manner and interacts with the substrate to form the signal beam and the reference beam as the substrate spins; and

the detector indicates the presence of the analyte based on an interference characteristic of the output beam, the output beam having a first interference characteristic if the first analyte is bound to the substrate and a second interference characteristic if the first analyte is not bound

to the substrate.

46. (Previously presented) The device of claim 45 wherein each of the first plurality of regions and the second plurality of regions are arranged in an alternating pattern, such that the first plurality of regions and the second plurality of regions form circular tracks on the substrate.

47. (Previously presented) The device of claim 45 wherein each of the first plurality of regions and the second plurality of regions are arranged in an alternating pattern, such that the first plurality of regions and the second plurality of regions form radially extending spokes on the substrate.

48. (Previously presented) The device of claim 47 wherein the first plurality of regions and the second plurality of regions are formed on the substrate by microfluidic printing.

49. (Previously presented) The device of claim 45 wherein the substrate includes a plurality of circular concentric tracks, each track including at least one of the first plurality of regions and at least one of the second plurality of regions, the first plurality of regions and the second plurality of regions being arranged in a repeating pattern.

50. (Previously presented) The device of claim 45 wherein the probe beam is generally normal to a surface of the substrate and the first plurality of regions has a first height and the second plurality of regions has a second height, the second height being offset relative to the first height.

51. (Previously presented) The device of claim 50 wherein the second height is offset relative to the first height by approximately one-eighth of a wavelength of the beam.

52. (Previously presented) The device of claim 50 wherein the second height is offset relative to the first height by approximately one-fourth of a wavelength of the beam.

53. (Previously presented) The device of claim 12 wherein the interferometer includes an adaptive holographic element.

54. (Currently amended) The device of claim 12 wherein the substrate includes a first <u>substantially planar</u> surface lying substantially in a first plane and a second <u>substantially planar</u>

surface lying substantially in a second plane, the first plane being offset vertically from the second plane, each of the first plurality of regions lying on the first substantially planar surface; and wherein the optical source is positioned relative to the substrate such that when the probe beam is directed at one of the first plurality of regions an interference characteristic is produced.

55. (Previously presented) The device of claim 54 wherein the substrate and the scanner are configured such that a first portion of the probe beam interacts with a target portion of the first surface holding one of the first plurality of regions, and a second portion of the probe beam interacts with a portion of the second surface adjacent to the target portion of the first surface, the first portion of the probe beam being about 50% of the probe beam and the second portion of the probe beam being about 50% of the probe beam, after interaction, the first and second portions of the probe beam being combined to produce the output beam, the output beam having a first form when the first analyte is not bound to the target portion of the first surface and a second form when the first analyte is bound to the target portion of the first surface.

56. (Previously presented) The device of claim 55 wherein the substrate has an upper side and a lower side, the lower side being opposite the upper side, the optical source and the adaptive optical element being on the same side of the substrate, and wherein the output beam includes the first portion of the probe beam reflected from the substrate and the second portion of the probe beam reflected from the substrate.

57. (Previously presented) The device of claim 55 wherein the substrate has an upper side and a lower side, the lower side being opposite the upper side, the optical source and the adaptive optical element being on opposite sides of the substrate, and wherein the output beam includes the first portion of the probe beam transmitted through the substrate and the second portion of the probe beam transmitted through the substrate.

58. (New) An interferometric detection device for identifying an analyte in a biological sample, the interferometric detection device comprising:

a substrate including a plurality of first regions and a second region, the second region separating the individual regions of the plurality of first regions, each of the plurality of first regions being substantially planar and lying substantially on a first plane, the second region being substantially planar and lying substantially on a second plane, the first plane being parallel

to the second plane and offset by an offset distance;

a receptor coating covering each of the plurality of first regions and not covering the second region;

an optical source configured to generate a probe beam having a wavelength λ, the probe beam illuminating a beam spot on the substrate;

a scanner configured to generate relative motion between the probe beam and the substrate such that the beam spot illuminates portions of the plurality of first regions and the second region to generate a return beam, the return beam including a signal beam generated by the interaction of the probe beam with a portion of the plurality of first regions and a reference beam generated by the interaction of the probe beam with a portion of the second region;

an interferometer including an adaptive optical element, the adaptive optical element positioned and configured to combine the reference beam and the signal beam to form an output beam; and

a detector configured to detect the presence or absence of the analyte based upon the output beam, the output beam having a first interference characteristic if the analyte is bound to the substrate and a second interference characteristic if the analyte is not bound to the substrate.

wherein the offset distance of the substrate and the wavelength of the probe beam are selected to create approximate phase-quadrature between the signal beam and the reference beam.